

NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD

PIPELINE

(Feet)

CODE 516

DEFINITION

Pipeline having an inside diameter of 8 inches or less.

PURPOSE

To convey water from a source of supply to points of use for livestock, wildlife, or recreation.

CONDITIONS WHERE PRACTICE APPLIES

Where it is desirable or necessary to convey water in a closed conduit from one point to another.

CRITERIA

Capacity. For livestock water, the installation shall have a capacity to provide seasonal high daily water requirements for the number and species of animals to be supplied. Animal water requirements can be obtained from the NRCS Engineering Field Handbook, Table 11-1.

For recreation areas, the water capacity shall be adequate for all planned uses. Typical examples are drinking water, fire protection, showers, flush toilets, and irrigation of landscaped areas.

Additional water capacity will be provided for wildlife when applicable.

Sanitary protection. If water from the pipeline is to be used for human consumption, applicable state and local regulations shall be met.

Pipe. All pipe must withstand the pressure it will be subjected to, including hydraulic transients, internal pressures and external pressures. As a safety factor against surge or water hammer, the working pressure should not exceed 72% of the pressure rating of the pipe and the design flow velocity at system capacity should not exceed 5 ft/sec. If either of these limits is exceeded, special

consideration must be given to flow conditions and measures must be taken to adequately protect the pipeline against surge.

Steel pipe shall meet the requirements of AWWA Specification C-200.

Plastic pipe shall conform to the requirements of the following ASTM specifications, as applicable:

D1527 - Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedules 40 and 80

D1785 - Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

D2104 - Polyethylene (PE) Plastic Pipe, Schedule 40

D2239 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Inside Diameter

D2241 - Poly(Vinyl Chloride) (PVC), Pressure-Rated Pipe (SDR)

D2282 - Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR)

D2447 - Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter

D2513 - Thermoplastic Gas Pressure Pipe, Tubing and Fittings

D2737 - Polyethylene (PE) Plastic Tubing

D2672 - Joints for IPS PVC Using Solvent Cement

D3035 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter

AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches through 12 inches

AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, ½ inch through 3 inches

Plastic pressure pipe fittings shall conform to the following ASTM specifications, as applicable:

D2464 - Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

D2466 - Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40

D2467 - Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

D2468 - Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40

D2609 - Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe

D2683 - Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing

D3139 - Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals

D3261 - Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

Solvents for solvent-welded plastic pipe joints shall conform to the following ASTM specifications, as applicable:

D2235 - Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings

D2564 - Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings

D2855 - Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings

Rubber gaskets for pipe joints shall conform to the requirements of ASTM F477, Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

Drainage. Valves or unions shall be installed at low points in the pipeline so that the line can be drained as needed. Check valves shall be installed as needed to protect groundwater quality or maintain a full pipeline.

Vents. Design shall provide for entry and removal of air along the pipeline, as needed, to prevent air locking or pipe collapse. If parts of the line are above the hydraulic gradient, periodic use of an air pump may be required. Provisions shall be made

for pressure relief, air relief and vacuum relief as needed to protect the pipeline.

Joints. Watertight joints that have a strength equal to that of the pipe shall be used. Couplings must be of material compatible with that of the pipe. If they are made of material susceptible to corrosion, provisions must be made to protect them.

Protection. When steel pipe is used, interior protective coatings shall be provided in accordance with NRCS Conservation Practice Standard 430-FF, Irrigation Water Conveyance, Steel Pipe. If a coal-tar enamel protective coating is needed for corrosion protection, the coating shall meet the requirements of AWWA Specification C-203.

Steel pipe installed above ground shall be galvanized or shall be protected with a suitable protective paint coating, including a primer coat and two or more final coats.

Plastic pipe installed above ground shall be resistant to ultraviolet light throughout the intended life of the pipe.

All pipes shall be protected from hazards presented by traffic, farm operations, freezing temperatures, fire, thermal expansion and contraction. Reasonable measures should be taken to protect the pipe from potential vandalism.

Vegetation. Disturbed areas shall be established with vegetation or otherwise stabilized as soon as practical after construction. Seedbed preparation, seeding, fertilizing, and mulching shall conform to NRCS Conservation Practice Standard Critical Area Planting, Code 342.

Visual resources. The visual design of pipelines and appurtenances in areas of high public visibility shall be carefully considered.

PLANS AND SPECIFICATIONS

Plans and specifications for installing pipelines shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the pipeline is a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

OPERATION AND MAINTENANCE

An O&M plan specific to the type of installed pipeline shall be provided to the landowner. The plan shall include, but not be limited to, the following provisions:

- Opening/closing valves to prevent excessive water hammer;
- Filling at the specified rate requirements;
- Inspecting and testing valves, pressure regulators, pumps, switches and other appurtenances;
- Maintaining erosion protection at outlets;
- Checking for debris, minerals, algae and other materials which may restrict system flow; and
- Draining and/or providing for cold weather operation of the system.

REFERENCES

Engineering Field Handbook, Part 650, National Engineering Handbook, USDA-NRCS

Chapter 3, Hydraulics

Chapter 12, Springs and Wells.